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An Old Industry Stays Young.....	J. J. Morgan	1
Tenant, Landlord, Farm Benefit From Good Lease.....	Max M. Tharp	4
Will Big Feed Crops Mean More Meat?.....	Harold F. Breimyer	6
Outlook High Lights.....		8
Over Half of Chicken Dollar to Farmers.....		9
Farmers Mechanize Work at Record Rate.....	A. P. Brodell and J. A. Ewing	10
Wider Horizons for Television.....	C. A. Herndon	12
Many New Alfalfa Plants in Kansas.....	H. L. Collins	13
USDA Asks Bigger Spring Pig Crop.....		14

An Old Industry Stays Young

LONG before George Washington was born, the production of naval stores was a flourishing industry in the New World. With ax and chipper, the settlers bled the sap from trees of the vast colonial forests and converted it into pitch for caulking the seams of wooden sailing ships and tar for waterproofing their ropes.

Pitch and tar accounted for nearly all of the production of naval stores in the early days. Today boats and shipyards take only a tiny fraction of our output but the name "naval stores" has stuck. By far the most important products of the industry now are turpentine and rosin which are used in medicines, chemicals, paint, varnish, lacquer, oils, greases, linoleum and other floor coverings, matches, shoe polish, soap, adhesives, insecticides, paper, printing ink, and many other necessities.

Until World War I, practically all of the naval stores produced in this country came from the gum of living trees. Since then, we have developed three new processes. In two of them, naval stores are made from pine stumps; in the other they are byprod-

ucts of sulphate paper mills. As a result, products from living trees—called "gum naval stores"—now account for less than half of total output.

Most gum is still collected from trees in much the same way as in colonial times. Workers cut V-shaped "streaks" about one-half inch deep on one side of the tree. The gum flows down the streaks and is guided into clay or metal cups by metal strips called gutters. The cups hold 1 to 2 quarts each and are emptied about every 3 weeks.

To keep the gum flowing, a new streak is cut on a tree every week, each about half an inch above the preceding one. Twenty-five to 30 streaks are usually cut each season. One side, or face, of a tree is worked out in 5 to 7 years. If the tree is of fair size, the operation can be repeated on the opposite side.

This process requires a lot of hard labor but little equipment. Axes and chipping tools are needed to cut the streaks, cups, and gutters to collect the gum, buckets and barrels to carry it, and trucks to haul it away. Except that trucks have replaced carts and wagons, mechanization has had little

effect. The only other important change in equipment is the adoption of cups and gutters in place of "boxes" which used to be cut into the tree at the base of the face. Boxes could be used on the larger trees of the virgin forests but are not suitable for the smaller second growth pines which have been the principal source of gum for many years.

In recent years, another method has been developed. Instead of cutting streaks into the tree trunk, strips of bark are removed and a chemical which stimulates the flow of gum is applied to the exposed wood. However, suitable equipment for applying the chemical has not been perfected and this method is not yet widely used.

Labor Specialized

In the old days, a worker was usually assigned a "crop" of 10,000 trees during the season. The "crop" has become the standard measure of the size of a gum operation. Some of the large turpentine producers control or operate 50 or more crops.

Labor has tended to become specialized. Chipping is a "man-sized" job that can be done only by the able-bodied. To see that no trees are skipped, operators employ "woods riders" to spot check the work. The older men and women and the children collect the gum. As on cotton farms, the whole family usually takes a hand in the work.

The methods of producing naval stores from gum have changed much more than the way of collecting the gum. In colonial times, the small amount of low-grade turpentine and rosin produced was distilled in crude cast iron retorts. The products improved when copper fire stills came into use in 1834. Fifteen years ago more than 1,000 of these fire stills were in operation with most large producers having their own. The turpentine and rosin produced in them usually were sold through factorage firms which, in most cases, financed the producer.

The introduction of improved central stills in 1934 marked an important turning point in the gum industry. These plants produced higher grades of rosin which gave a wider margin of

profit than could be obtained from gum processed in the old fire stills. At present 30 of these plants in the gum turpentine belt produce about 90 percent of all gum naval stores.

Development of central plants and a ready market for gum have had a far-reaching effect on the gum industry. Before 1934 most of the naval stores were produced by specialized turpentine operators who leased, rented, or purchased tracts for turpentine. While this practice continues, the number of farmers who work their own trees has increased tremendously. In many cases, these farmers are receiving more income from gum sales than from other farm products.

The gum industry, while still important, has been overshadowed in recent years by the "wood" industry in which naval stores are produced from stumps or are a byproduct of paper making. The former in particular has been an unexpected stroke of good fortune to many dirt farmers in southern areas.

Hundreds of thousands of long and slash pine stumps were left in the wake of the sawmills that ate away the virgin forests of the Southeastern and coastal gulf regions. Stumps left in pastures and woodlands were largely untouched. Some of those left in cultivated fields were grubbed out but many remained. Instead of a nuisance, these stumps are now a source of income for many farmers and a rich source of raw materials for the naval stores industry.

Two Processes Used

Unlike the gum industry, the wood industry is highly mechanized. Specially equipped crawler tractors root out the stumps which are loaded on trucks and hauled to the plant or a railroad siding. At the plant the stumps are unloaded by machine and placed on a conveyor which takes them through a washer and on to a grinder which breaks them up into chips.

How the broken up stumps are handled from then on depends on the process being used. In one, the steam distilled process, the chips are placed in an extractor. Steam and a solvent are used to separate out the turpentine, rosin, and other products. The spent chips are used for fuel.

In the other, the destructively distilled process, the broken up stumps are placed in a retort and heated. The gases are driven off and condensed. The main products from this process are turpentine, pine oil, and tar. No rosin is made. Stump wood originally placed in the retort is converted into charcoal. Some of the waste gases are used for generating the heat needed in the process.

The future of production of naval stores from stumps is not bright. The supply of usable stumps in the South is expected to be exhausted in around 20 years. Second-growth pine stumps may be worked after that but they are smaller and the rosin content is relatively low.

The third major section of the industry—sulphate naval stores—is another good example of how modern methods have greatly increased the value of a resource. For many years, southern pines were not used for making paper because they were saturated with resins. However, research provided a way of driving the resin out of the wood so that it could be used for making paper. The crude turpentine, which is a byproduct of this process, can be refined at little cost and can be used for fuel if it cannot be marketed at a profit.

Useful Byproduct

In addition to turpentine, sulphate pulp plants produce a byproduct called black liquor soap or tall oil skimmings. Most of these skimmings are now refined and the products obtained compete with rosin. Paper and chemical companies are spending considerable effort on research to develop other useful products from the skimmings. One company recently announced that a satisfactory cooking fat could be produced.

Gum and wood naval stores are interchangeable for most uses. Manufacture of wood products is the cheaper operation and as this industry has expanded, gum production has declined. Before 1924, wood turpentine and rosin accounted for less than 10 percent of total production. In the 1947-48 crop year, wood turpentine amounted to 54 percent and wood rosin 58 percent of

the totals. The rosin figure does not include sulphate rosin which was equivalent to about 8 percent of the combined output of gum and steam distilled rosin. Sulphate turpentine in that year accounted for about one-fifth of total output.

Industry to Shift

The production pattern of the industry probably will shift in the years to come. As the virgin long-leaf and slash pine stumps disappear, output of naval stores from this source will decline unless the potentialities of the western ponderosa pine are developed. On the other hand, sulphate naval stores are likely to become an increasing share of the total.

New sulphate mills are under construction in the South and additional plants are expected to be built. These mills are either buying or leasing large blocks of pulp land in the South which may not be available for production of gum naval stores. Some of the pulp companies are practicing forest management and a continuous supply of wood is assured. Many industrialists believe that pulp mills will be the main source of naval stores in the future.

Not only is there competition among naval stores produced by the various processes, but other products have made inroads into the industry. One group, in particular—the petroleum paint thinners—has dealt the industry a serious blow. In recent years, these products have captured a large part of the market for gum and wood turpentine.

Promise In Outlook

While competition has been serious, it has been far from fatal and there is much that is promising in the outlook for naval stores. The rising volume of sales of paint, varnish, lacquers, and fillers means a larger outlet. Many new synthetics contain rosin and other naval stores. Within the last year or two, a promising insecticide has been developed of which turpentine is a basic ingredient. No doubt the future will provide other outlets for the products of this ancient American industry.

J. J. MORGAN

Bureau of Agricultural Economics

Tenant, Landlord, and Farm

Benefit From a Good Lease

ALL OVER the country these days, landowners and tenants are sitting down together to talk over leases for the coming year.

If you are one of them, you are taking part in one of the big businesses of the country. Last year, tenants and part-owners operated rented land worth 23 billion dollars and they paid 3.2 billion dollars in rent. The rent alone is greater than the total cash receipts of all farmers in any one month of this year.

While the business of renting farm land totals big, it is made up mainly of a large number of small transactions between individual landowners and tenants. Rates of rent, time of occupancy, and other terms of the contracts they make are usually determined by the customs of the communities in which they live.

You may find the customary way of doing things satisfactory in some situations. Often though, it results in a lease that is not desirable for either party and in the long run is bad for the farm.

Fit Lease to Your Needs

For example, rent shares often are fixed by local customs. It may be that in your community the corn crop usually is divided 50-50. Such a provision can work against the best interests of one party or the other since it does not take into account what each contributes or the productivity of the farm. One tenant may pay for all of the hybrid seed while another pays for only half or none of it. Or to take another case, half the corn on a farm producing 25 bushels per acre is a much different rent than on one where yields average 60 bushels per acre.

Instead of depending on local custom to fix rent shares, you may find it better practice to divide farm production on the basis of what each party contributes after carefully weighing the productive capacity of the farm.

In other words, it is usually better to adapt the terms of your lease to your particular needs than to the customs of your neighborhood.

It is, of course, impossible to set down in one article specific terms that would apply to leases for farms in all parts of the country. However, there are a few principles that apply generally. If you are thinking about next year's lease, here are a few points you might want to consider:

Provide Stable Tenure

Length of occupancy: The best job of farming requires long-range planning. Unless the lease provides stable and secure tenure for the tenant he cannot plan for the future. The landlord also is handicapped since he has no assurance of keeping a good tenant when he has found one. Security of tenure enables the tenant to buy machinery, develop sound crop rotations, adopt technological improvements, and build up productive herds and flocks—practices that help increase the income of both tenant and landlord.

Long-term leases are one way of providing a secure tenure. However, you may object to a contract that runs for several years. In this case, a year-to-year lease containing a provision for automatic renewal might suit your needs. Such a lease would remain in effect until notice is given in writing. The period of notice required varies but it usually should not be less than 4 to 6 months. An Iowa law, for example, provides for a 4-month notice. Leases containing automatic renewal clauses make the term flexible yet give a high degree of certainty of occupancy.

A fair rent: There may be danger in a fixed cash rent at a time when prices of farm products are likely to fluctuate widely. Share renting helps spread risks. Both the tenant and landlord share in the hazards and windfalls of changes in production and prices.

There also is danger in a rent that is either too high or too low. If the rent is too high, the tenant may have to "exploit" the farm to pay the rent, lower his level of living, or both. In either case, the farm and the working relationship between landlord and tenant suffer.

If the rent is too low, on the other hand, the landlord may not be able to maintain and improve the farm as a productive unit.

On an adequate sized, productive farm an enterprising and skillful tenant should be able to make money and accumulate capital. At the same time, the landlord's returns should be sufficient for him to maintain and develop the farm and provide a satisfactory rate of interest on his investment. In making a lease it is good practice to keep this goal in mind.

Ends Uncertainty

A plan for the farm: The possibility of a farm earning a fair return for both tenant and landowner over the long-run is much better if the lease contains a plan for farm organization and management. Under most leases, tenants are uncertain how long they are going to stay on a farm or to what extent they will receive benefits from soil conservation and other improvements they make. For this reason, many tenant farms are not kept up as well as those operated by owners.

This shortcoming can be largely overcome by an agreement in the lease to pay the tenant for the unexhausted value of improvement made by him and left on the farm when he leaves. For example, some landlords and tenants use "conservation agreements," or "conservation supplements" in their leases.

Written Lease Best

A written lease: After you have talked over the various terms of your lease and agreed upon specific items, you probably will want to put them in writing. Of course, an oral lease is just as valid as a written lease but the latter has many important advantages.

Chief among them are: (1) you will not have to depend upon your memory

concerning the specific items agreed upon and thus you may avoid misunderstandings, (2) you are likely to consider more carefully all details of the agreement when you put them in writing, (3) adjustments you make from year-to-year and from time-to-time throughout the year will be easier, and (4) in case of your death, your heirs will be protected against misinterpretation of the agreement.

Sources of Information

If you want advice in making your lease, your county agent is a good man to see. For general information you can write your State College of Agriculture for bulletins or lease forms. Also you may be interested in the United States Department of Agriculture's two recent publications on leasing. (1) *Better Farm Leases*. Farmer's Bulletin 1969, and (2) *Your Farm Lease*, Miscellaneous Publication 627. Both of these publications are free. They can be obtained from your county agent or direct from the Department of Agriculture, Washington, D. C.

MAX M. THARP

Bureau of Agricultural Economics

New Tomato Introduced

The introduction of Southland, a new home garden and market tomato that is resistant to collar rot and nearly immune to fusarium wilt, has been announced by the Department of Agriculture. Commercial firms will have a limited supply of seed on the market in time for fall planting in 1948, and larger supplies for 1949.

In addition to resistance to collar rot and fusarium wilt, the Southland also shows a moderate degree of resistance to early blight and to one form of late blight. While it is susceptible to some forms of late blight, the new variety responds better to protective sprays than do other varieties. The same spray program now used for well-known commercial varieties is also recommended for the Southland.

Will Big Feed Crops Mean More Meat, Milk, and Eggs?

THE largest corn crop ever raised by United States farmers is ready for the picker or shredder. When it is finally in the crib, feed supplies will have made one of the biggest 1-year jumps in the history of the country.

Dry figures tell a dramatic story. The supply of corn—crop plus stocks—will be 36 percent larger in 1948-49 than last year. The supply of the four feed grains—corn, oats, barley, and sorghums—will gain 29 percent. The total of all feed concentrates will be up 22 percent. Compared to the number of livestock on their farms, producers will have far more feed than ever before.

Six-Year Decline

The rest of the story—what this big feed supply means in terms of next year's output of meat, eggs, milk, and other livestock products—is yet to be written. Livestock production has declined steadily in the last 6 years. Many people are wondering whether the bumper feed crops will enable farmers to reverse this downward trend next year.

A brief look at some recent history helps point out what we can expect. We find that over several years, trends in feed and livestock production tend to follow each other closely. The accompanying chart shows that when feed supplies rose from 1937 to 1942, livestock production increased too. The increase in the feed supply came from several sources. We began building up stocks in 1938. Livestock numbers were very low at that time, non-feed uses were declining, and government programs aided storage. Starting in 1939, feed grain production rose rapidly for several years. We imported considerable grain in a couple of years. Production of byproduct feeds increased.

The feed reserves we built up disappeared after a couple of years when farmers used feed at extremely heavy

rates, drawing not only on feeds currently produced, but also on the large reserves of corn and wheat. After 1942, feed supplies declined every year except 1946. As the chart shows, production of livestock products also declined.

Increases Differ

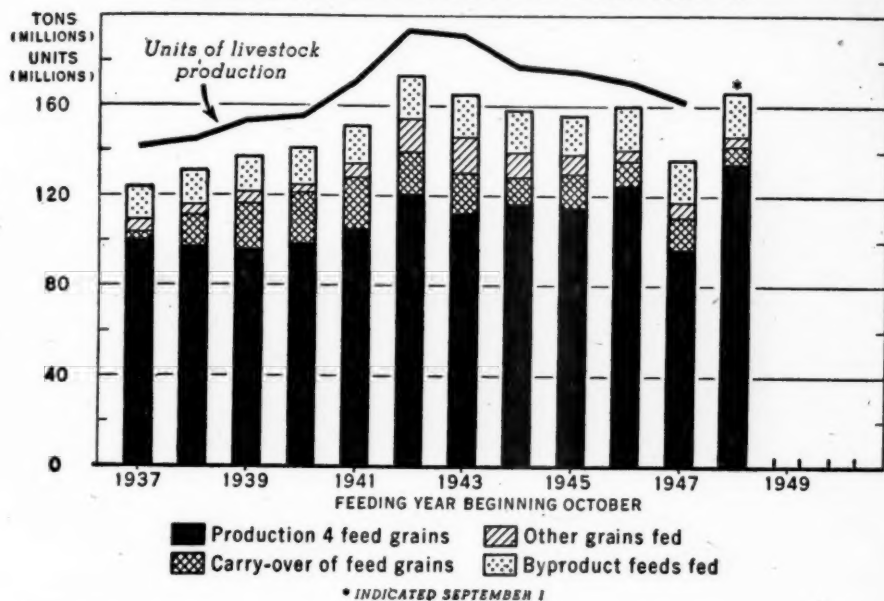
Some kinds of livestock respond more rapidly than others when feed supplies change. Between calendar years 1938 and 1943, total units of livestock production increased 44 percent. Biggest gains were made in chicken production. Aided by the long-run growth of the broiler industry, it rose 88 percent. Hog output expanded 77 percent. Egg production was up 46 percent. Less than average increases were made by cattle and calves, which went up 36 percent. Milk output, which is comparatively stable, rose 11 percent. Sheep and lambs, already facing growing competition for range, increased only 3 percent.

Although these trends in feed and livestock production follow each other closely, the situation within any one year can be quite different. In the very short run of a few months, or a year, livestock production is rather slow to change. A 1-year increase in feed production, such as that of 1946-47, usually has a comparatively small effect on livestock production.

Storage Cuts Increase

There are two main reasons for this: (1) Farmers usually store a part of their larger crops, especially if they start the feeding year with exceptionally small carry-overs. (2) The only quick response farmers can make to more feed is to increase their feeding rates for livestock already on hand. Heavier feeding will yield more milk per cow and eggs per hen and increase slaughter weights of hogs and cattle. But production of these products does not rise in proportion to the increase

SUPPLY OF ALL CONCENTRATES AND VOLUME OF ALL LIVESTOCK PRODUCTS PRODUCED, FEEDING YEARS 1937-48



U. S. DEPARTMENT OF AGRICULTURE

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in feeding. In many years, livestock output has risen only half as much as the quantity of concentrates fed.

Lag in Meat Gain

Even after farmers begin to step up livestock production, market supplies of meat are slow to increase. It takes 9 months to raise a new-born pig into a butcher hog and 2 years or more to produce a slaughter steer. In fact, the first effect of a large feed supply is to reduce market supplies of meat temporarily because some gilts and heifers are held back for breeding.

In 1949 the livestock industry is likely to respond to increased feed supplies in much the same way as in the past. Feed specialists estimate that total carry-over of feed grains will rise from 8 million tons at the beginning of the 1948-49 feeding year to 22 million tons at the end of the season. Therefore, the 22 percent gain in the total feed supply will result in an increase of only about 8 percent in the quantity

fed to livestock. This may result in a gain of only 3 or 4 percent in livestock production.

Heavier rates of feeding probably will increase milk production per cow and total production for the year. Eggs laid per hen may be higher but flocks have been reduced and total egg production may be about equal to this year. Biggest gain over 1948 may be made by those fast-growing producers, hogs and chickens.

New Uptrend May Begin

More hogs, chickens, and milk and less lamb and beef are likely to add up to an increase of only 1 or 2 percent in the supplies of livestock products available to consumers in 1949. But even though the gain is small, it will end the downtrend of the last 6 years. It also can set the stage for a new uptrend in livestock production if feed crops in 1949 again are large.

HAROLD F. BREIMYER

Bureau of Agricultural Economics

Outlook Highlights

..... October 1948 ..

The Farmer's Share

In mid-July, farmers were receiving 53 cents out of the consumer's dollar spent for food products. The other 47 cents went to wholesalers, retailers, transportation companies, and others taking part in the marketing process.

The farmers' share of the consumer dollar spent for butter was 77 cents, the highest among the food products. His share for other dairy products, chicken, eggs, and meat ranged from 62 cents to 76 cents. For vegetables, cereals, fruits, and other products, farmers received from 16 to 50 cents of the consumer's dollar.

During the last 5 years, the farmers' share of the consumer's food dollar has ranged from 50 to 55 cents. In 1935-39, it averaged 40 cents.

11.4 Hours Per Day

Farm operators over the country were putting in an average of 11.4 hours every workday around September 1. Workdays of those in the Middle Atlantic and West North Central States were longest; those of operators in the Pacific States shortest. Hired workers averaged 9.6 hours per workday.

Hired farm employment on Septem-

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ber 1 was about 3 million, the largest number for the date since 1943.

Liberal Vegetable Supplies

Housewives can expect liberal supplies of most vegetables the rest of the year. Late summer and fall production, from which the bulk of supplies will come, is expected to be at least one-tenth above last year and the 1937-46 average. Demand will be as strong, perhaps even stronger, than in the same months of 1947 but because of increased supplies prices are likely to average lower.

World Rice Trade Rising

World trade in rice increased from 2.1 billion pounds in 1945 to about 6 billion pounds in 1947; probably is continuing to gain this year, reports the Office of Foreign Agricultural Relations. However, trade still is far below prewar average of 20 billion pounds.

Nut Crop a Record

United States crops of almonds, walnuts, filberts, and pecans were estimated on August 1 at a record 184,000 tons, 14 percent larger than in 1947 and 29 percent larger than the 10-year average. With imports of tree nuts expected to be about the same in 1948-49 as in current season, total supplies will be up moderately. Prices in 1948-49 are expected to average below 1947-48.

Expect Smaller Fruit Pack

The 1948-49 pack of commercially-canned fruits is expected to be moderately smaller than the 1947-48 pack. Stocks of canned fruits in the hands of packers and wholesale distributors on June 1 were generally larger than a year earlier.

Domestic demand for canned fruits this season may not be as strong as last and exports probably will be down. Prices in 1948-49 may be lower than last season.

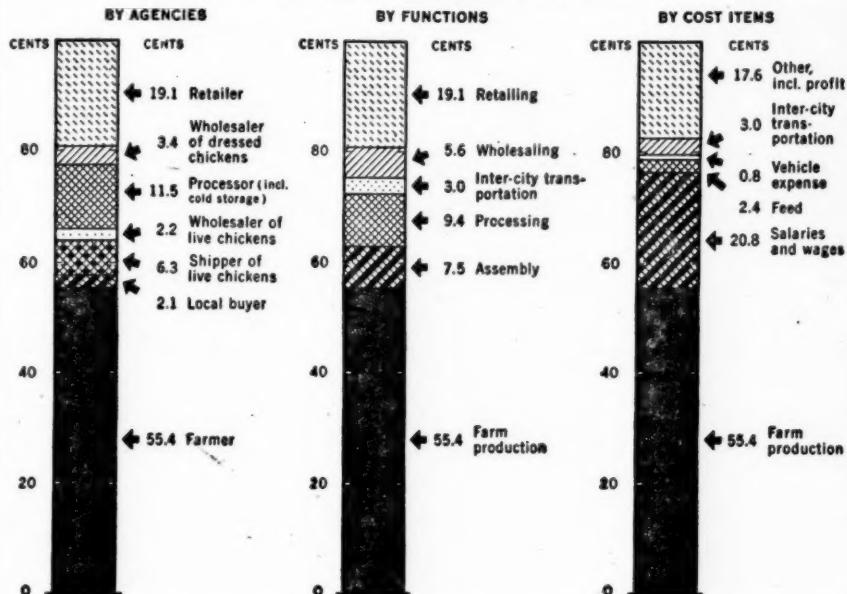
Citrus Juice Pack a Record

The canned citrus juice pack for 1947-48 is estimated at 2 billion pounds,

(Continued on p. 16)

CHICKENS: APPROXIMATE DISTRIBUTION OF THE CONSUMER'S DOLLAR, BY MARKETING AGENCIES, BY MARKETING FUNCTIONS, AND BY COST ITEMS, UNITED STATES, 1939

(BASED ON OFFICIAL AND OTHER DATA AND PARTLY ESTIMATED)



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Over Half of Chicken Dollar to Farmers

CHARGES for marketing generally take from a third to a half of the consumer's dollar spent for chicken while the rest is received by poultrymen.

The ways these charges were divided among the various marketing agencies, by the functions they performed and by the costs that entered into the marketing process in 1939 is shown in the accompanying chart. The chart is included in a forthcoming study on marketing margins for poultry and eggs by E. P. Winter, formerly of the Bureau of Agricultural Economics.

The study shows that an average of 44.6 cents of the consumer's chicken dollar was accounted for by marketing. The remaining 55.4 cents went to poultry farmers. During the war, the marketing share dropped as low as 33 cents but in 1947 it was up to 43.

Retailers accounted for nearly half of the marketing charges in 1939 (see

bar on left in chart), receiving by far the largest share of any marketing agency. Processors, including cold storage operators, received about a fourth. Smaller amounts went to local buyers, shippers, and wholesalers.

Marketing charges broken down by the costs of the functions performed by the various agencies in 1939 are shown by the center bar of the chart. This break-down differs from that of marketing charges by agencies because some of the agencies perform two or more functions.

Among the marketing costs, wages and salaries were the largest item, accounting for an average of 20.8 cents, or almost half of all marketing costs. (See bar on right in chart.) Transportation, feed, and vehicle expenses took 6.2 cents while profits and other costs accounted for 17.6 cents.

Farmers Mechanize Work at Record Rate in Last Decade

FARMERS switched from animal power to machine power and from hand methods to machine methods more rapidly in the past 10 years than in any other decade in history.

This year, they are using more than twice as many tractors as in 1939. The numbers of many tractor-drawn machines on their farms are up even more.

Increased mechanization during the past decade has been accompanied by a 40-percent drop in the number of horses and mules on farms. Furthermore, the amount of work done per animal also has declined. As a result, more than 60 percent of the farm work requiring tractor or animal power this year is being done with tractor machines.

Crop Reporters Help

The switch from work animals to tractors has changed farmers' crop work in many ways. These changes are measured in a study, "Extent of Use of Tractor Power, Animal Power, and Hand Methods in Crop Production," recently published by the Bureau of Agricultural Economics. Information

on which this study was based was furnished by the Bureau's voluntary crop reporters.

The study shows that from 1939 to 1946 the proportions of the principal kinds of farm work done by tractor machines increased sharply. (See table.) In some cases, the gains were double or triple and in all cases they were substantial:

Hand Work Declines

Most of these increases, of course, were at the expense of animal-powered machines. Handwork also is on the decline. Although still important in cotton and potato production, and in the corn harvest, hand methods are used very little in the other farm crop jobs covered in the study.

In both 1939 and 1946 a higher proportion of the heavy draft jobs like plowing, listing, bedding, and disking was done with tractor machine than the lighter draft jobs like planting, cultivating, and harrowing. For the entire country, it is estimated that 82 percent of the breaking of land in 1946 was done with tractor machines and equipment compared with 55 per-

Sources of Power Used in 10 Farm Jobs

Operation	Percent of work done with—					
	Tractor machines		Animal-drawn machines		By hand methods	
	1939	1946	1939	1946	1939	1946
Breaking land (plowing, listing, bedding).....	55	82	45	18	-----	-----
Disking.....	57	85	43	15	-----	-----
Harrowing (spike and spring tooth).....	43	77	57	23	-----	-----
Drilling small grains.....	49	79	51	21	-----	-----
Planting corn.....	13	41	81	56	6	3
Planting cotton.....	21	43	79	57	-----	-----
Planting potatoes.....	14	43	38	19	48	38
Cultivating corn.....	30	64	70	36	-----	-----
Cultivating cotton.....	21	45	79	55	-----	-----
Harvesting small grains.....	69	90	30	10	1	0.4

cent in 1939. Disking is even more highly mechanized with tractor-drawn disks accounting for 85 percent of the work done in 1946.

Big Gain in Light Work

The extent of the use of tractor power for heavy draft jobs varied greatly in different parts of the country during 1946. More than 95 percent of the breaking and disking of land was done with tractor machines in the Great Plains, the Western Corn Belt, California, and some other States. In the Southeast, Appalachian, and Delta States, on the other hand, animal-drawn equipment was used for the bulk of the breaking of land. In only four States, however, was the largest share of the disking done with animal power.

Although farmers had about twice as many tractors in 1946 as in 1939, only 50 percent more land was broken with tractor equipment. However, use of tractor power for relatively light duty jobs like planting corn, cotton, and potatoes, and cultivating corn and cotton more than doubled.

Better for Light Work

This reflects the increased use of rubber tires on tractors and the fact that the newer tractors are more suitable for light duty work. Most of the wheel tractors sold to farmers since 1939 have been equipped with rubber tires. Many tractors which had steel treads in 1939 have since been equipped with rubber tires.

Despite the tremendous increase in the use of tractor power for light duty jobs, over half the corn and cotton was cultivated with animal-drawn machines.

Small grains were the most highly mechanized major crop in both 1939 and 1946. Farmers harvested about 90 percent of the 1946 acreage of small grains with tractor machines. About two-thirds of the total acreage was harvested with combines.

Corn producers have adopted tractor power rapidly in the last 10 years. Farmers used tractor machines to plant only 13 percent of the acreage in

1939. In 1946, the percentage had risen to 43.

Use of tractor planters was most important in the Great Plains where they accounted for 70 percent of the planting. In most Southern States, less than 15 percent of the corn was tractor planted. Use of tractor cultivators for corn also rose sharply, accounting for about two-thirds of the United States acreage in 1946 compared with only 30 percent in 1939. In major corn States, tractor cultivators were used on more than 80 percent of the corn.

More Corn Pickers

Of the corn acreage farmers harvested for grain in 1946, mechanical corn pickers were used for 41 percent compared with only 12 percent in 1938 and 27 percent in 1943. The corn picker is used most extensively in the Corn Belt and Lake States where the yield per acre is much above average. For this reason, a higher proportion of the crop than of the acreage was harvested with corn pickers.

Although work animals still provide the bulk of the power for cotton in many areas, the large part of the seed-bed preparation, planting, and cultivating in Oklahoma, Texas, and the irrigated areas is done with tractor machines.

Hand Pick Most Cotton

Nearly all of our cotton is still harvested by hand. Machine strippers and the mechanical cotton pickers together were used to harvest less than 1 percent of the 1945 and 1946 crops. Picking by hand accounted for more than 80 percent of the crops in both years while hand snapping accounted for over 15 percent.

Slightly less than 40 percent of the potato acreage was hand planted in 1946 compared with about half in 1939. Hand methods generally prevail where the acreage per farm is small and the potatoes are used largely for home and local consumption. In most commercial potato areas machine planters and elevator type diggers are used generally.

A. P. BRODELL
J. A. EWING

Bureau of Agricultural Economics

Wider Horizons *for* Television

IN TELEVISION, more is happening than meets the eye.

Developments are going forward in the business and engineering side of telecasting that can mean much, to many thousands of people, not only in the big cities, but on the farms.

The Federal Communications Commission reports the television map is changing fast. New stations are coming on the air—almost every few days. If we give the number of television stations at present operating in the United States as 31, consider that landmark already past when you read the figure. Last December the number was only 11. Up to then, the FCC had authorized a total of 65. As of July 1, the Commission reported 108 television stations authorized and building in 34 States.

Expenses Are Heavy

As important as baseball and the political conventions have been in selling receiving sets, the rapid recent developments represent no mere mushroom growth. Months of planning, work, and determination are going into each station. The average cost of a television station is about \$200,000 (compared to about \$50,000 for the average FM station) and operating expenses run very high compared to ordinary radio. Remember, too, we had a half-dozen television stations even before the war.

Even then, far-sighted station managers and government officials glimpsed the potential value of the new means of communication for agricultural broadcasting. As early as September 3, 1941, the U. S. Department of Agriculture and the NBC television station in New York City started a 13-week series demonstrating the meaning of grades and standards to New York homemakers. During the war, the Department and the Balaban and Katz station in Chicago used television to help shift consumer demand to the more plentiful foods.

Of course, since the war, with more stations, more receiving sets, and im-

proved techniques, the Department, several States and stations have tried out other types of agricultural television broadcasts, especially those designed for suburban as well as city listeners. This summer some stations have made demonstrations in gardening a regular television feature.

Telecast Map Changing

So far, the Northeastern States have more stations on the air than other parts of the country. This region also has the first big regional networks, tying together television stations in Boston, Schenectady, New York City, Philadelphia, Baltimore, Washington, and Richmond, Va. By the time stations now authorized and building are all operating, the States from Maine to Maryland will have almost as many as the whole country has now.

But by that time, the telecast pattern of the United States will be considerably different. Then California will have as many stations as New York State. And Ohio will have almost as many as either.

Corn Belt May Lead

In fact, at that time, the North Central States comprising the great eastern Corn Belt, may emerge as the leading television region of the country. Anyway, large segments of farm population will be within the range of television.

Considerable television activity is also taking place in the Southeastern and Southern Plains States, and in the East Central States. But little development is in sight in the Northern Plains States. The wide open spaces seem to offer an effective barrier to television on most of our western farms and ranches in the very near future.

As television engineering is now understood, television for both transcontinental and thorough rural coverage faces two limitations:

One is the expense—which calls for a large center of population to support the station.

Range Is Short

The other is the range of the television signal which goes straight out from the station tower to the horizon—which means that effective reception is ordinarily limited to within a radius of 50 miles of the sending station.

But experiments have already demonstrated that even these limitations may not prove insurmountable. By putting an antenna and transmitter in an airplane, flying it in lazy circles 6 miles above the earth, and rebroadcasting television programs beamed to the plane from a ground station, the experimenters managed to increase the effective radius of the television station to 250 miles. Proponents of this so-called "stratovision" claim with 14 such relay planes, flying about 400 miles apart, they could bridge the continent and make television available for nearly

four-fifths of our population. Even the proposed 14 planes would leave wide spaces in the West uncovered.

USDA Studies Television

Whether this or some other engineering wonder will provide truly rural television all over the country remains to be seen. In the meantime, however, television as a practical new means of communication is now extending its coverage nearly every day.

The Department under the Research and Marketing Act of 1946 has authorized the Radio Service to do research on how to use television to best advantage in spreading information on marketing and use of farm products. So the Department aims to gain "know-how" even as television grows.

C. A. HERNDON
Radio Service, USDA

Many New Alfalfa Plants in Kansas

THE popularity of dehydration as a method of processing alfalfa has risen rapidly in Kansas in recent years.

A study made by the State Board of Agriculture and the Bureau of Agricultural Economics under the Research and Marketing Act shows that 72 alfalfa dehydration plants are operating in Kansas this year. Sixty of them were started after January 1, 1944. All but 6 of the 72 plants are in the eastern half of the State.

Last year, green alfalfa from 54,900 acres, about 5 percent of the State's total harvested acreage, was dehydrated. Production of alfalfa meal from this acreage was 142,400 tons, an average of 2.6 tons per acre. Hot, dry weather in July and August reduced 1947 production materially below 1946, even though plant capacity was considerably larger.

Sun-cured alfalfa also is dehydrated but makes up only a minor part of production. Four plants in Kansas are processing sun-cured hay only and

eight others are handling both green and sun cured.

Only about 12 percent of all alfalfa meal produced stays in Kansas. The rest is shipped out of the State before being fed, blended, or further processed. At present, the main use of the meal is in poultry feeds but use in dairy and hog rations is increasing.

Dehydrating plants purchase alfalfa from farmers as it stands in the field and pay costs of harvesting, processing, sacking, and other items. For the first two cuttings of alfalfa purchased from farmers this year, plants paid an average of \$10.87 per ton (meal basis). This is 21 percent more than the \$9.04 paid during the same period of 1947 and 2 percent more than the 1947 season average.

Last year, prices paid farmers ranged from \$7.50 to \$8 per ton for the first cutting to \$18 to \$20 for the last. Each successive cutting brought a higher price.

H. L. COLLINS
Bureau of Agricultural Economics

USDA Asks Bigger Spring Pig Crop

THE U. S. Department of Agriculture is urging the Nation's farmers to produce the largest peacetime spring pig crop on record in order to increase the supply of meat.

The 1949 spring pig goal calls for 60,000,000 pigs—an increase of 17 percent or nearly 9,000,000 more than the 1948 spring crop. This will require an increase of about 21 percent in sows farrowing if litters are of average size.

The goal aims to help provide for consumption of all meats averaging 150 pounds per person in late 1949 and 1950, when the 1949 spring pigs will be ready for market. This will exceed the average consumption of 145 pounds expected this year and will be much above the prewar average consumption of 126 pounds. Increased pork output will help maintain total meat supplies above the present level as farmers and ranch-

ers start rebuilding herds for beef, veal, lamb, and mutton.

Officials stated that although this year's record corn crop would provide enough feed for an even larger pig crop than the goal announced today, the number of sows and gilts available for breeding this fall and winter will be the limiting factor in spring pig production. The spring pig crop requested for 1949 would be the third largest of record and the largest since the war years of 1942 and 1943, when a record total of 61 million and 74 million spring pigs were produced.

As this year's record corn crop has grown toward maturity, feed prices have declined and the relationship to hog prices has become more favorable for greater hog production. A hog-feed price relationship favoring hog production is expected to continue next year with average crop-producing weather in 1949.

Prices of Farm Products

[Estimates of average prices received by farmers at local farm markets based on reports to the Bureau of Agricultural Economics. Average of reports covering the United States weighted according to relative importance of district and State]

Commodity	5 year average		Sept. 15, 1947	Aug. 15, 1948	Sept. 15, 1948	Parity price, Sept. 15, 1943
	August 1909-July 1914	January 1935-December 1939				
Wheat (bushel).....dollars..	0.884	0.837	2.43	1.96	1.97	2.21
Rye (bushel).....do.....	.720	.554	2.48	1.46	1.39	1.80
Rice (bushel).....do.....	.813	.742	2.33	2.56	2.16	2.03
Corn (bushel).....do.....	.642	.691	2.40	1.91	1.78	1.60
Oats (bushel).....do.....	.399	.340	1.08	.683	.687	.998
Barley (bushel).....do.....	.619	.533	1.78	1.14	1.08	1.55
Sorghum grain (100 pounds).....do.....	1.21	1.17	3.29	2.07	2.16	3.02
Hay (ton).....do.....	11.87	8.87	16.10	17.80	18.00	29.70
Cotton (pound).....cents.....	12.4	10.34	31.21	30.41	30.94	31.00
Cottonseed (ton).....dollars.....	22.55	27.52	75.60	76.60	68.10	56.40
Soybeans (bushel).....do.....	1.96	.954	3.03	2.91	2.45	2.40
Peanuts (pound).....cents.....	4.8	3.55	10.00	10.4	10.4	12.0
Flaxseed (bushel).....dollars.....	1.09	1.09	6.18	5.75	5.74	4.22
Potatoes (bushel).....do.....	1.697	.717	1.48	1.58	1.53	1.86
Sweetpotatoes (bushel).....do.....	.878	.807	2.40	2.65	2.32	2.20
Apples (bushel).....do.....	.96	.90	2.41	2.22	2.44	2.40
Oranges on tree (box).....do.....	*2.29	1.11	1.31	1.43	1.96	3.80
Hogs (hundredweight).....do.....	7.27	8.38	*28.70	27.10	27.30	18.20
Beef cattle (hundredweight).....do.....	5.42	6.56	*19.00	24.40	24.20	13.60
Veal calves (hundredweight).....do.....	6.75	7.80	*21.40	26.60	26.20	16.90
Lambs (hundredweight).....do.....	5.88	7.79	*21.50	24.80	23.40	14.70
Butterfat (pound).....cents.....	26.3	29.1	84.0	81.1	75.8	*65.4
Milk, wholesale (100 pounds).....dollars.....	1.60	1.81	*4.45	*5.00	5.08	*4.12
Chickens (pound).....cents.....	11.4	14.9	27.9	32.5	31.9	28.5
Eggs (dozen).....do.....	21.5	21.7	53.0	49.2	51.4	*57.6
Wool (pound).....do.....	18.3	23.8	*41.9	47.1	46.3	45.8

* Comparable base price, August 1909-July 1914.

† Comparable price computed under the Steagall amendment.

‡ 1919-28 average of \$1.12 per bushel used in computing parity.

* Revised.

† 1919-28 average for computing parity price.

‡ Adjusted for seasonal variation.

Economic Trends Affecting Agriculture

Year and month	Industrial production (1935-39 = 100) ¹	Income of industrial workers (1935-39 = 100) ²	1910-14=100					Index of prices received by farmers (August 1909-July 1914=100)			
			Average earnings of factory workers	Whole-sale prices of all commodities ³	Prices paid by farmers		Farm wage rates ⁴	Livestock and products			
					Com-modities	Com-modities, interest, and taxes		Dairy products	Pou-ltry and eggs	Meat animals	All live-stock
1910-14 average.....	58	50	100	100	100	100	100	100	101	101	101
1915-19 average.....	72	90	152	158	151	150	148	148	154	163	158
1920-24 average.....	75	122	221	160	161	173	178	159	163	123	142
1925-29 average.....	98	129	232	143	155	168	179	160	155	148	154
1930-34 average.....	74	78	179	107	122	135	115	105	94	85	93
1935-39 average.....	100	100	196	118	125	128	118	119	100	119	117
1940-44 average.....	192	238	325	139	150	147	212	162	146	171	164
1945 average.....	203	291	403	154	180	172	350	197	196	210	203
1946 average.....	170	275	391	177	202	193	378	242	198	256	240
1947 average.....	187	332	440	222	246	231	408	269	221	340	293
1947											
September.....	187	346	449	230	253	238	404	282	246	367	315
October.....	180	348	455	231	254	239	404	283	251	360	313
November.....	192	352	458	233	257	241	404	283	242	338	304
December.....	192	364	471	238	262	245	404	311	262	352	320
1948											
January.....	193	359	466	242	266	251	425	313	231	379	328
February.....	194	354	462	235	263	248	425	307	218	331	300
March.....	191	358	466	236	262	247	425	298	212	342	302
April.....	188	341	462	238	264	249	420	296	214	347	304
May.....	192	349	464	239	265	250	420	291	211	361	309
June.....	192	360	473	243	266	251	420	291	221	390	326
July.....	186	361	473	246	266	251	431	300	234	417	344
August.....	190		249	266	266	251	431	305	247	411	344
September.....				265	265	250	431	302	253	408	343

Year and month	Index of prices received by farmers (August 1909-July 1914=100)								Parity ratio ⁵
	Crops							All crops and live-stock	
	Food grains	Feed grains and hay	To-bacco	Cotton	Oil-bearing crops	Fruit	Truck crops		
1910-14 average.....	100	101	102	96	98	99	99	100	100
1915-19 average.....	193	164	187	168	187	125	168	162	106
1920-24 average.....	147	126	192	189	149	148	143	151	86
1925-29 average.....	140	119	172	145	129	141	140	143	89
1930-34 average.....	70	76	119	74	72	94	106	86	66
1935-39 average.....	94	95	175	83	106	83	102	97	94
1940-44 average.....	123	119	245	131	159	133	172	143	103
1945 average.....	172	161	366	171	215	220	224	201	117
1946 average.....	201	195	382	228	244	226	204	226	121
1947 average.....	271	246	380	261	335	194	249	261	120
1947									
September.....	278	297	352	252	311	181	179	254	120
October.....	302	284	357	247	344	168	238	261	121
November.....	312	283	354	257	349	151	272	268	119
December.....	318	305	377	275	367	149	294	281	123
1948									
January.....	322	318	377	267	377	135	320	284	122
February.....	251	261	374	248	333	136	320	257	112
March.....	260	284	372	256	339	140	295	262	115
April.....	268	291	371	275	351	142	340	276	117
May.....	261	282	370	284	357	141	262	267	116
June.....	249	278	370	284	364	155	213	261	118
July.....	240	256	370	266	366	172	213	253	120
August.....	227	235	386	245	310	183	172	236	117
September.....	223	223	406	250	282	185	150	231	116

¹ Federal Reserve Board represents output of mining and manufacturing; monthly data adjusted for seasonal variation.

² Computed from data furnished by Bureau of Labor Statistics and Interstate Commerce Commission on pay rolls in mining, manufacturing, and transportation; monthly data adjusted for seasonal variation. Revised August 1948.

³ Bureau of Labor Statistics.

⁴ Monthly data adjusted for seasonal variation. ⁵ Revised.

⁶ Ratio of prices received to prices paid for commodities, interest, and taxes.

⁷ 1924 only.

⁸ Preliminary.

Outlook Highlights

(Continued from p. 8)

a new record. Prices have been relatively low and movement of the juices has been large. As a result, the 1948-49 pack probably again will be large.

Bigger Frozen Fruit Pack

The 1948 pack of frozen strawberries is expected to set a record; that of peaches, apples, and sour cherries may be a little larger than in 1947. Total pack of commercially-frozen fruits, berries, and fruit juices is expected to be up a little from last year.

Larger Wheat Stocks Likely

Wheat stocks next July 1 are likely to exceed the prewar average. Out of the supply of about 1,480 million bushels estimated for 1948-49, about 750 millions may be used in the United States and at least 450 millions exported. This would leave a carry-over of around 275 million bushels on July 1, 1949. Stocks this July totaled 195. The 1932-41 average was 235 million.

Farm Prices Down Again

With prices of about two-thirds of the principal livestock and crop items declining from mid-August to mid-September, the index of prices received by farmers in September declined for the second straight month.

Most of the declines were small and were partly offset by increases in prices of hay, milk, hogs, eggs and cotton. At 290, the index was 1 percent below a month earlier and about as much above a year earlier. Compared with September 1947, crops are down 9 percent while livestock and products are up the same amount.

The index of prices paid by farmers, including interest and taxes also was down slightly from mid-August to mid-September. A substantial drop in feed prices plus some declines in family living items brought the index down 1 point to 250.

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